NOTES ON THE WHITFIELD COUNTY, GEORGIA, METEORIC IRONS, WITH NEW ANALYSES.

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It will be recalled that in 1881 in the American Journal of Science (vol. 21), W. E. Hidden described an iron meteorite from Whitfield County, Georgia, and gave a cut illustrating the etched surface, but no chemical analyses. In 1883, C. U. Shephard, in the same journal, published a description of a still larger mass, weighing some 117 pounds, from near Dalton in the same county, and in this description expressed a doubt as to whether this iron might not be identical with that previously described by Hidden. In 1887, again, George F. Kunz in writing on the East Tennessee (Cleveland) iron suggested that this too might be identical with the large mass of the Whitfield County iron. This refers, presumably, to the Dalton of Shepard. It was for the purpose of deciding these questions that the present investigation was undertaken, opportunity for which was offered by the final acquisition by the United States National Museum of the Shepard collection, which contained the 117-pound mass.

Referring to the two irons described by Hidden and Shepard, respectively—

These differ quite radically in structure, as shown in plate 78, figure 1 being an etched surface of the iron described by Shepard, and figure 2 of the mass described by Hidden. The Hidden iron, it will be observed, is marked by broad plessite areas and a peculiar swelling of the kamacite bands, while between the two alloys are the regularly disposed, parallel-lying taenite bands. In the Shepard iron the kamacite bands are not swollen, but show very straight borders, the taenite bands are thinner, so thin indeed, as to be scarcely recognizable, and the plessite areas much less conspicuous. More important yet is the presence in this iron of small, irregularly scattered, granular, and dendritic particles of schreibersite, shown somewhat indistinctly in white in figure 1 of the plate. These were noted by Shepard and described as being often interrupted at short intervals, so that they resemble the markings of telegraph ribbons, and the continuous lines

sometimes swelling into triangular or polygonal enlargements forming a string of nearly disconnected beads. Shepard, however, did not discriminate between the taenite and schreibersite, and the two are often so closely associated and intergrown as to make this a matter of difficulty. The most characteristic distinction is that the taenite lies in very thin films parallel to the kamacite, while the schreibersite is in knots, granules, and dendritic forms, sometimes by itself but often attached to or continuous with the taenite films. That these forms are of the phosphide has been determined by separation and microchemical tests. There is, further, a marked difference in the manner in which the two irons etch, the Hidden iron etching quickly and yielding a bright, lustrous surface, while that described by Shepard, under precisely the same conditions, is acted upon much more slowly and gives a dull surface, on which the figures show less distinctly.

An analysis of the Shepard iron as given in the paper referred to shows:

	Per cent.
Iron (Fe)	94.66
Nickel (Ni)	4.80
Cobalt (Co)	.34
	99.80

There being reasons for doubting the accuracy of this analysis, it was repeated at my request by J. E. Whitfield, with the following results:

	Per cent.
Silicon (Si)	0.001
Sulphur (S)	.025
Phosphorus (P)	.095
Manganese (Mn)	None.
Carbon (C)	.004
Nickel (Ni)	7.575
Cobalt (Co)	.550
Copper (Cu)	.016
Platinum (Pt)	Traces.
Iridium (Ir)	.002
Iron oxide (Fe_2O_3)	.350
Iron (Fe)	91.469
	100.087

A partial analysis of the iron described by Hidden shows a very close resemblance, so far as the two essential constituents are concerned, Nichols's results, as quoted by Farrington,[1] giving:

	Per cent.
Iron (Fe)	91.02
Nickel (Ni) and cobalt (Co)	7.38
	98.40

[1] Mem. Nat. Acad. Sci., vol. 13, 1915, p. 155.

Notwithstanding this close chemical resemblance, which is not at all unusual for irons of this class, I am, on the grounds of structure and etching peculiarities, convinced that the irons represent two distinct falls, and would suggest that the Hidden iron be known, as first described, under the name *Whitfield County*, and that described by Shepard as *Dalton*. They will be so listed in the future in the United States National Museum catalogue.

As to the suggested identity of the Shepard iron with that of Cleveland, as made by Kunz, while there is some resemblance between the two, I can not agree with his statement that the figures on the Cleveland and Shepard irons are identical. (See pl. 78.) Further than this, the Shepard (Dalton) iron shows nowhere on the five cut surfaces now available any of the Reichenbach figures, which are so pronounced on that of Cleveland, and which Cohen has further noted on that described by Hidden (the Whitfield County iron). A further difference is noted in the composition of the Cleveland iron, as determined by Genth, the results given in Kunz's paper being as follows:

	Per cent.
Iron (Fe)	89.93
Copper (Cu)	.06
Nickel (Ni)	8.06
Cobalt (Co)	.56
Phosphorus (P)	.66
Sulphur (S)	Not determined
	99.27

It is my present opinion that the three irons represent three distinct falls.

EXPLANATION OF PLATE 78.

(All figures natural size.)

FIG. 1. Etched surface of the Dalton iron described by Shepard. Cat. No. 90. (Shep. Coll.)

2. Etched surface of the Whitfield County iron described by Hidden. Cat. No. 520.

3. Etched surface of the Cleveland, East Tennessee, iron described by G. F. Kunz. Cat. No. 58.

36399°—Proc.N.M.vol.51—16——29